

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 5816

CSAH NO. 3

OVER THE

RED RIVER OF THE NORTH

DISTRICT 2 - NORMAN COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 3512 (CEI 41)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure unit inspected at Bridge No. 5816, Pier 2, was in good to satisfactory condition with no defects of structural significance observed. Minor scaling on both noses and a hairline crack at the midpoint on both faces of the pier was observed above and below the waterline. A light accumulation of timber debris was also present around the upstream nose of Pier 2. The east bank was observed to be heavily eroded with undermining and exposed piling at the East Abutment. The channel bottom appeared to be in stable condition with minor degradation since the previous inspection.

INSPECTION FINDINGS:

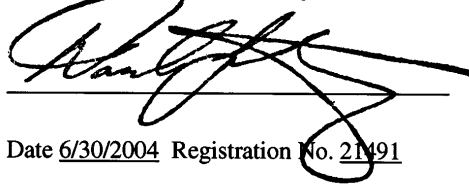
- (A) A light accumulation of timber debris, consisting of branches up to 8 inches in diameter, was observed at the upstream nose of Pier 2 extending from the channel bottom to 3 feet above.
- (B) A vertical hairline crack was observed on both sides of Pier 2 at the midpoint extending from 11 feet above to 2 feet below the waterline.
- (C) Light scaling was observed at both noses of Pier 2 extending from 1.5 feet above to 0.5 feet below the waterline with a maximum penetration of 1/8 inch.
- (D) The east bank exhibited heavy erosion that extended back to the East Abutment and the abutment exhibited undermined with exposed piling.

RECOMMENDATIONS:

- (A) Monitor the erosion at the East Abutment during future routine and underwater inspections, and if found to be increasing in the future, repair operations may become warranted.
- (B) Reinspect the submerged substructure unit at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

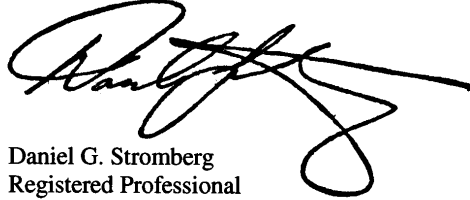
Daniel G. Stromberg

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 5816

Feature Crossed: The Red River of the North

Feature Carried: CSAH No. 3

Location: District 2 - Norman County

Bridge Description: The superstructure consists of two steel through truss spans. The superstructure is supported by two reinforced concrete abutments and one reinforced concrete pier. The abutments are supported by treated timber piles. The pier is supported by untreated timber piles. The substructure units are designated Abutment 1, Pier 2, and Abutment 3 starting from the southerly end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Clayton G. Brookins, Michelle D. Koerbel

Date: October 28, 2002

Weather Conditions: Rainy, $\pm 35^{\circ}$ F

Underwater Visibility: Negligible/None

Waterway Velocity: ± 1 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 2

General Shape: The pier shaft consists of two multi-sided columns connected by a slender diaphragm wall braced with an integral horizontal strut. The shaft sits on a rectangular footing supported by timber piles.

Maximum Water Depth at Substructure Inspected: Approximately 12 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the downstream end of Pier 2.

Water Surface: The waterline was approximately 31.0 feet below reference.
Waterline Elevation = 821.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

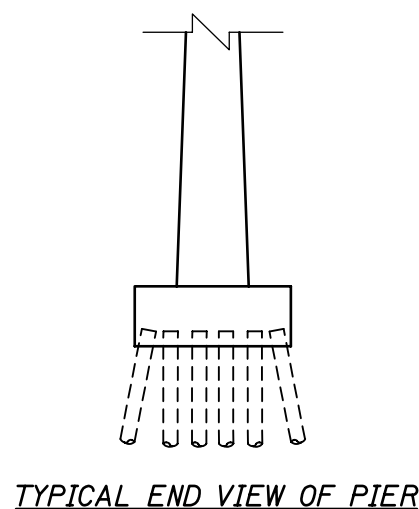
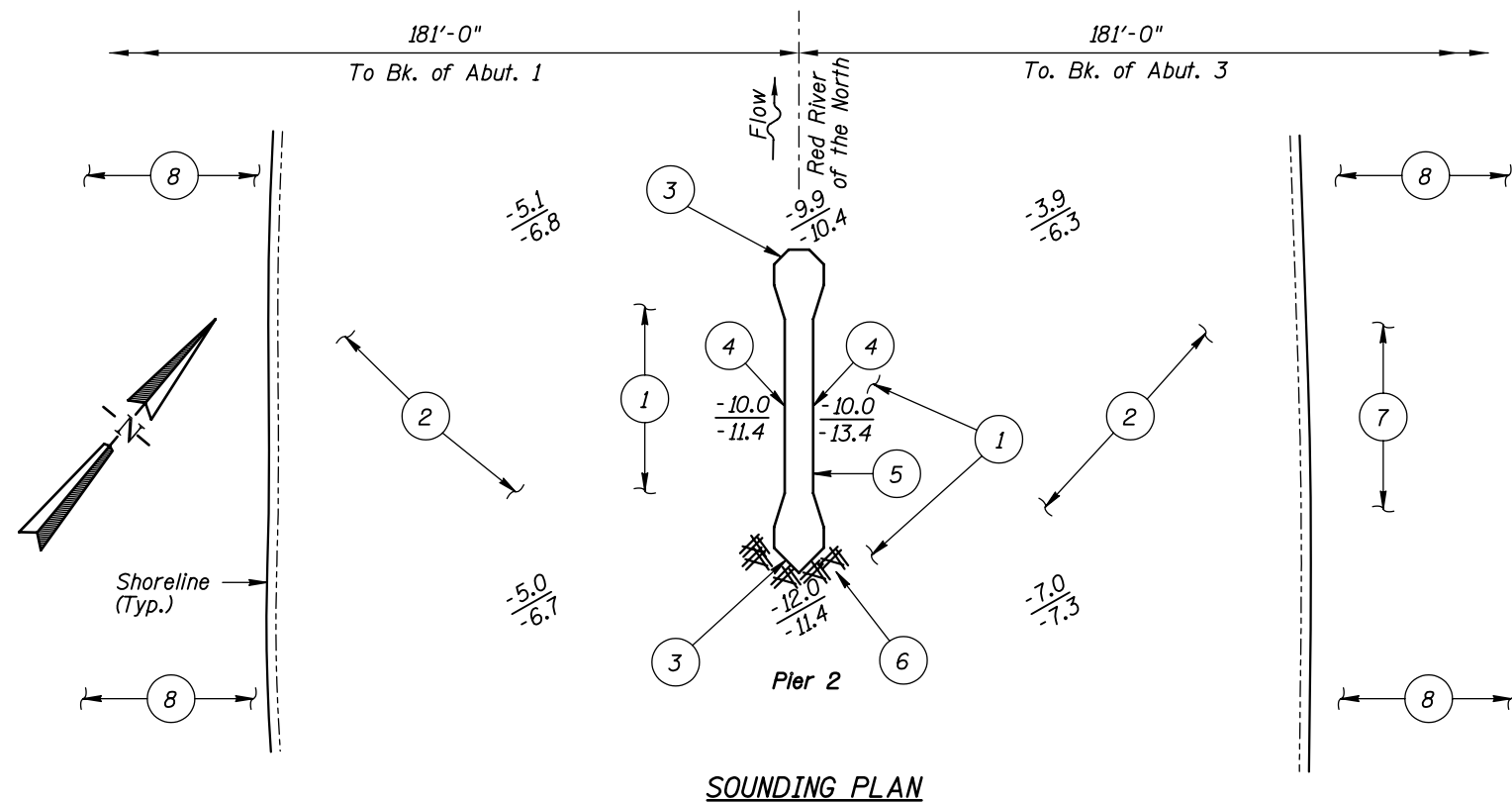
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/02

Item 113: Scour Critical Bridges: Code I/91

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No



GENERAL NOTES:

- Pier 2 was inspected underwater.
- At the time of inspection on October 28, 2002, the waterline was located approximately 31.0 feet below the top of the pier cap at the downstream end of Pier 2. This corresponds with a waterline elevation of 821.5 based on the previous report dated September 8, 1997.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- The channel bottom material around the pier shaft consisted of gravel with up to 2 inches of probe rod penetration.
- The channel bottom material consisted of silt with up to 1 foot of probe rod penetration.
- Light scaling was observed at the pier noses from 1.5 feet above the waterline to 0.5 feet below the waterline with a maximum penetration of 1/8 inch.
- A hairline crack was observed at the midpoint of Pier 2 on both sides, extending from 11 feet above the waterline to 2 feet below the waterline.
- Formed openings, measuring 8 inches wide by 8 inches high, were observed along Pier 2 at 6.5 feet below the waterline at 1/4 point intervals.
- Timber debris consisting of 6 to 8 inch diameter branches was observed around the upstream nose of the pier, extending approximately 8 feet out from the pier shaft and approximately 3 feet above the channel bottom.
- The east bank exhibited heavy erosion that extended back to the East Abutment and the abutment exhibited undermining with exposed piling.
- Heavy bank erosion was observed along the banks of the channel upstream and downstream of the bridge.

Legend

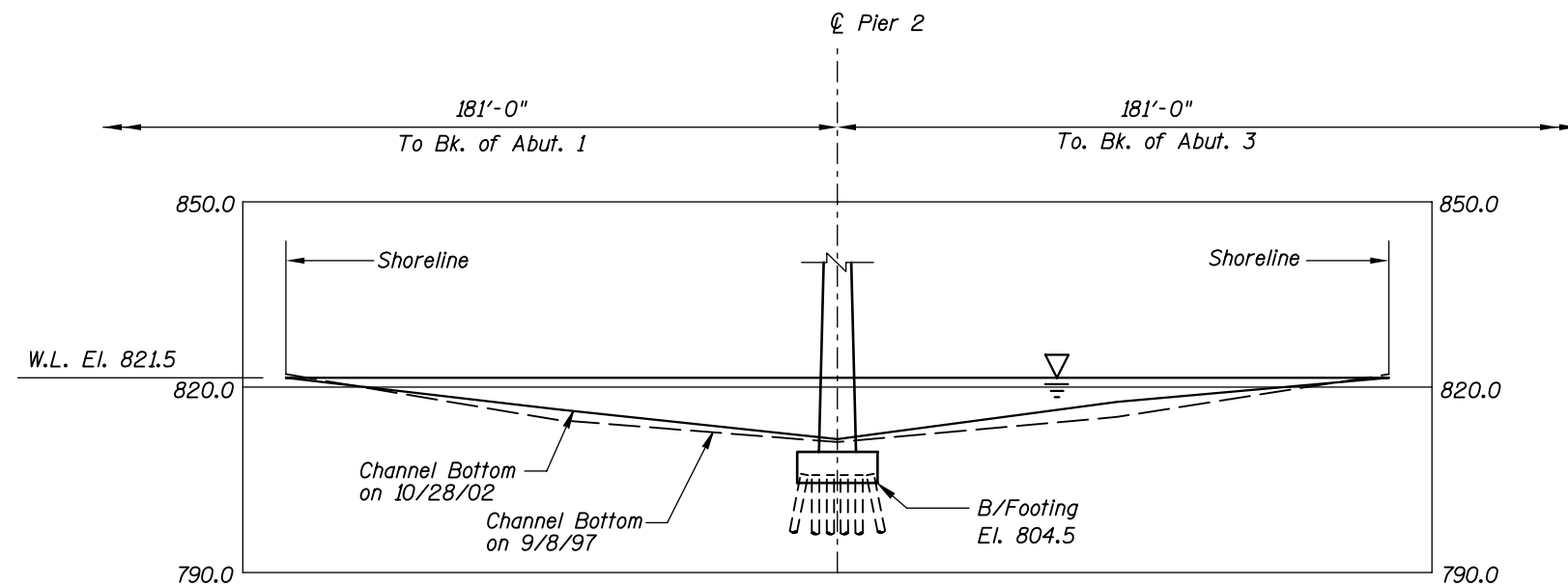
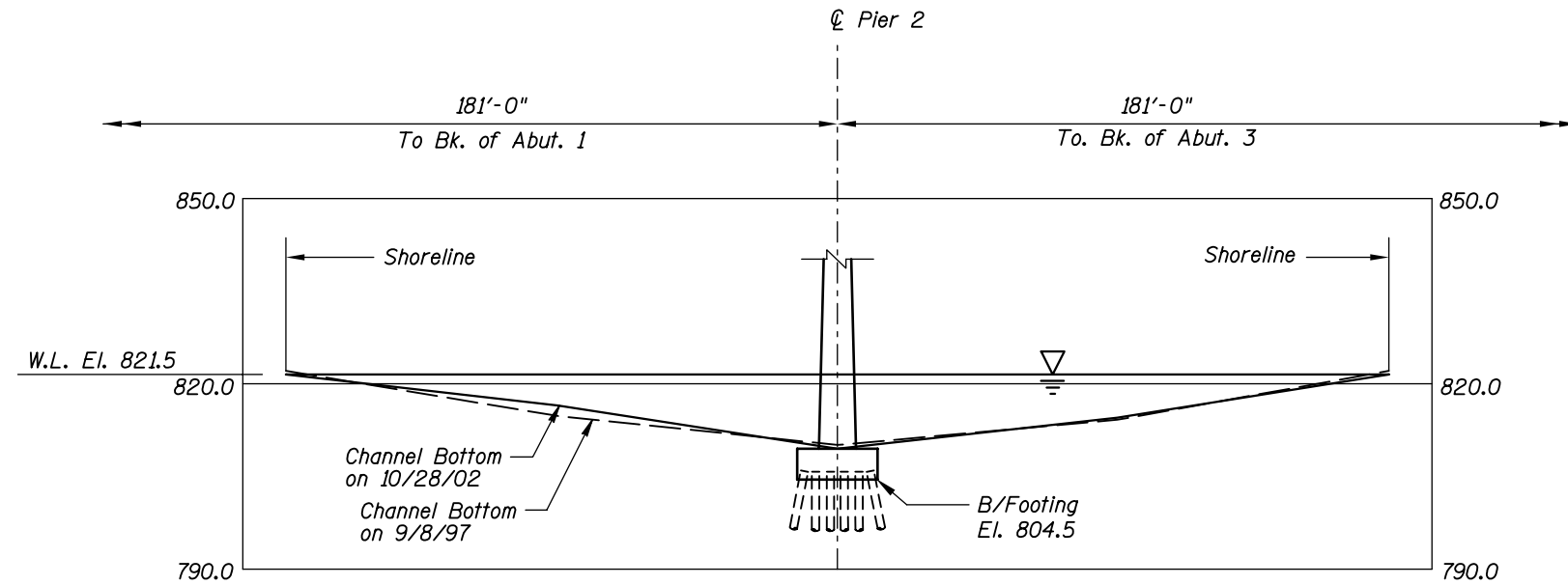
- 2.0 Sounding Depth from Waterline (10/28/02)
- 5.2 Sounding Depth from Waterline (9/8/97)
- Timber Debris

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 5816
OVER THE RED RIVER OF THE NORTH
DISTRICT 2, NORMAN COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120041		Figure No.: 1



Note:

Refer to Figure 1 for General Notes.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 5816
OVER THE RED RIVER OF THE NORTH
DISTRICT 2, NORMAN COUNTY
**UPSTREAM AND DOWNSTREAM
FASCIA PROFILES**

Drawn By: PRH
Checked By: MDK
Code: 3512004I



COLLINS ENGINEERS, INC.
300 W. WASHINGTON, STE. 600
CHICAGO, ILLINOIS 60606
(312) 704-9300

Date: OCT. 2002
Scale: 1"=30'
Figure No.: 2



Photograph 1. View of the Structure, Looking South.



Photograph 2. View of Pier 2, Looking North.



Photograph 3. View of the Undermining at the East Abutment, Looking East.



Photograph 4. View of Pier 2 at the Waterline, Looking Southwest.



Photograph 5. View of the Downstream Nose of Pier 2, Looking North.



Photograph 6. View of West Abutment, Looking Southwest.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc.

DATE: October 28, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 5816

WEATHER: Rainy, " 35° F

WATERWAY CROSSED: The Red River of the North

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Clayton G. Brookins, Michelle D. Koerbel

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 11:15 P.M.

TIME OUT OF WATER: 11:50 P.M.

WATERWAY DATA: VELOCITY " 1 f.p.s.

VISIBILITY Negligible/None

DEPTH 12 feet maximum at Pier 2

ELEMENTS INSPECTED: Pier 2

REMARKS: The pier concrete was generally in good condition with some minor scaling around both noses at the waterline, and hairline vertical cracks on each side face. There was a light accumulation of 6 to 8 inch diameter timber debris at the upstream end of Pier 2. The upstream and downstream banks exhibited heavily eroded slopes, with the East Abutment exhibiting undermining with exposed piling due to erosion.

FURTHER ACTION NEEDED: _____ YES X NO

Monitor the erosion at the East Abutment during future inspections, and if found to be increasing in the future, repair measures may be warranted.

Reinspect the submerged substructure unit at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5816
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Red River of the North

INSPECTION DATE October 28, 2002
NOTE: USE ALL APPLICABLE CONDITION
DEFINITIONS AS DEFINED IN THE MINNESOTA
RECORDING AND CODING GUIDE INCLUDING
GENERAL, SUBSTRUCTURE, CHANNEL AND
PROTECTION, AND CULVERTS AND WALL
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 2	12.0'	N	7	N	9	N	7	6	N	N	6	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The pier concrete was generally in good condition with some minor scaling around both noses at the waterline, and hairline vertical cracks on each side face. There was a light accumulation of 6 to 8 inch diameter timber debris at the upstream end of Pier 2. The upstream and downstream banks exhibited heavily eroded slopes, with the East Abutment exhibiting undermining with exposed piling due to erosion.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.